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Peru's Fishmeal Industry

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Foreword

Fishmeal—used primarily as an ingredient in poultry rations—has grown in importance in recent years with the general rise in poultry and livestock production. Today, it ranks second, after soybean meal, among all the meals traded internationally.

Chief beneficiary of the growing international interest in fishmeal has been Peru, whose fishmeal industry has undergone spectacular development since the early 1950's and now provides the country's top earner of foreign exchange. From a mere 12,000 metric tons in 1953, production rose to 1.9 million tons in 1968. Peru supplies two-fifths of the world's fishmeal production and some three-fifths of its exports. These exports compete on the international market with U.S. soybean and other oilseed meals. In addition, the United States has ranked among Peru's top three export markets for fishmeal, the others being West Germany and the Netherlands.

This publication—based on a study conducted in July 1968—examines the development of Peru's fishmeal industry since the early 1950's.

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Peru's Fishmeal Industry

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Introduction

Peru's fishmeal industry, producer of the country's chief earner of foreign exchange, depends almost entirely on a small fish known commonly as the anchovy. About 16 cm. or slightly over 6 inches long, the anchovy accounts for approximately 98 percent of the fish caught off the Peruvian coast. The anchovy catch rose substantially from 756,000 metric tons in 1958 to 9,825,000 in 1967. The catch for 1968 is believed to have approximated 10.5 million tons.

Peru's Sea Institute has estimated the country's maximum sustainable fish catch—the level that would maintain a basic fish population and still provide a major industry—at 8.0 to 8.5 million tons. The catch exceeded 8.5 million tons in 1964, 1966, 1967, and 1968. A limitation on the anchovy catch has provisionally been set at 8.2 million tons for the current fishing season (Sept. 1968-Aug. 1969).

The volume of the anchovy catch is highly vulnerable to two natural factors: changes in the Humboldt Current, which flows north along the South American west coast carrying cool water rich with food for the fish; and the number of guanays (commonly called guano birds), waterfowl that prey on the anchovy.

At one time Peru's major fishing port was Callao, the port for the capital city of Lima. After 1962 Chimbote—farther up the coast—displaced Callao and has maintained the number-one position. Both the number and size of fishing vessels have increased greatly since the early 1950's, and Peru's fleet now has the capacity to haul in a catch of nearly 20 million tons, about double the 1968 catch.

The number of fishmeal plants in operation in Peru has fluctuated during the past decade, but their total capacity is currently estimated at two to three times the approximately 10.5 million tons of fish caught in 1968. Fishmeal outturn per ton of fish is fairly constant at about 18.5 percent or 370 pounds.

Peru must find export markets for its fishmeal production since domestic consumption is only about 30,000 tons per year. Increasing exports prove the country's ability to find the needed foreign markets.

Production

The ports and fleet

In the early years of the fishmeal industry, Callao was the major fishing port. By 1962 Chimbote had increased its catch and was tied with Callao. Since 1962 the former has pulled ahead and currently accounts for one-third of the entire anchovy catch. At the same time Callao's catch fell from about 30 percent to 12 percent of the total, and this port is being closely challenged for the number-two spot by Tambo de Mora. The port that showed the most spectacular increase during 1962-67 was Pisco, whose share increased from less than 0.4 percent to 8.4 percent of the total catch (tables 1 and 2).

The number of fishing vessels has increased substantially since 1953, when there were only 52. By 1963 the number had risen to 1,571 (table 3), and current estimates place the fleet at 1,700. However, the entire fleet does not work on any given day because of breakdowns, major overhauls, etc.

More important than the number is the size of the vessels. A trend toward larger vessels has been evident since the early 1950's. In 1963 there were 521 vessels of a length between 65 and 69 feet. It is estimated that fishing boats currently being built can hold 160 to 180 tons of fish, and the largest vessels are estimated to hold 200 tons or more. Recent information on the fishing fleet is currently being prepared by the Instituto del Mar del Peru (Sea Institute) located at Esquina General Valle y Gamarra, Callao, Peru.

The average daily anchovy catch in 1967 was estimated at 57,792 tons (table 4). Fishermen worked only 170 days because of vedas (closed seasons), a lockout, and no fishing allowed on Saturdays and Sundays.

The fishing boats made 132,625 trips in 1967, with an average catch of 74.1 tons per trip (table 5). It is estimated that a processing plant needs a fishing fleet with a capacity twice that of the plant. This is because a boat may go out and return empty or perhaps half full. It is estimated that the total catch capacity of the fishing fleet is nearly 20 million tons.

The anchovy catch

Peru's anchovy catch was 9.8 million tons in 1967 and is estimated to have reached 10.5 million in 1968.

The Sea Institute estimates the anchovy resource at about 25 million tons. Natural predators—birds and larger fish—consume substantial quantities of this supply. Undoubtedly, the anchovy catch could exceed the record of some 10 million tons; what is of concern to conservationists is the possible damage to the so-called "basic stock." Would a catch of 11 million tons deplete the anchovy population to the point where it would be in danger of complete annihilation?

The concept of a "maximum sustainable yield" is a catch at such a level that the reproduction ability of the anchovy is not impaired. The Sea Institute has indicated that this level is about 8.0 to 8.5 million tons. The anchovy catches in 1967 and 1968 substantially exceeded this level.

Many factors affect the anchovy population available for fishing. Two of the most important are the Humboldt Current and the guanay population.

The Humboldt Current flows north along the west coast of South America and is accompanied by southeasterly winds that carry surface water away from the coast. The warm surface water is replaced by cooler water that brings plankton and nekton to the surface. This material attracts and supports a wide variety of marine life, including the anchovies.

Guanays are waterfowl whose major source of food is the anchovy. It is estimated that 20 million guanays would consume about 4 million tons of anchovies annually. In 1965 the guanay population was about 17 million and consumed about 3.5 million tons of anchovies. The following year the population dropped way down to 3 million, consuming 0.6 million tons of fish, and the year after that it rose slightly to 4.5 million, consuming 0.9 million tons. The decline between 1965 and 1967 in the estimated amount of fish consumed by the guanays was equal to the increase in Peru's fish catch.

The drop in the number of guanays in 1966 resulted from a change in the Humboldt Current. Cool waters containing the plankton and nekton did not rise to the surface. As a result, the anchovies had to swim deeper for food, and the guanays had to dive deeper to find the fish. Many of the birds were unable to find sufficient food and perished.

As the guanay population rebuilds, it could place a real strain on the allowable anchovy catch as it relates to the maximum sustainable yield.

Fishmeal plants and output

The number of fishmeal plants operating at specified times during the 1961-67 period is estimated as follows:

Date	Working plants
Dec. 31, 1961	103
Dec. 31, 1962	117
June 30, 1963	130
Dec. 31, 1963	149
June 30, 1964	127
Dec. 31, 1967	131

The potential processing capacity of these plants was estimated at between 22 and 30 million tons in 1963, depending on whether the mills operated 3,200 or 4,400 hours annually. The present plant capacity is believed to be above the 1963 level because larger, more efficient plants have been constructed to replace some of the older ones. The rated processing capacity far exceeds the actual fish catch. Because the supply of raw material is uncertain and restrictions are placed on the number of fishing days allowed, plants frequently operate at less than capacity. Undoubtedly, the more efficient fishmeal production plants are able to increase production as older, less efficient ones are closed down.

The number of plants and their working days in 1967 are shown in the following tabulation:

Days of work	Number of plants	Percent
0-25	8	6.1
26-50	10	7.6
51-75	9	6.9
76-100	18	13.7
101-125	14	10.7
126-150	38	29.0
151-175	33	25.2
176-200	1	.8
Total	131	100.0

Source: Instituto del Mar del Peru.

Peruvian fishmeal output has shown a dynamic growth since the early 1950's, largely as a result of phenomenal increases in the anchovy catch. Production rose from 12,000 tons in 1953 to 1,816,000 in 1967 and about 1.9 million in 1968. This increased production has resulted in a substantial buildup in stocks, which were at a record 600,000 tons on January 1, 1968. A stock this large exceeds the country's entire annual fishmeal production as recently as 1960 (table 6). Generally, when stock levels exceed 400,000 tons, fishmeal prices f.o.b. port have been less than $120 per ton.

It takes over 5 tons of fish to produce 1 ton of fishmeal. During the period 1963-67, fishmeal outturn varied between 17.2 and 18.5 percent.

A review of monthly data shows that fishmeal outturn per ton of fish is highest during May-December, with a falling off during January-April (table 7). Fishmeal production during the veda (closed season) must be from fish caught prior to the closing and from small quantities of fish other than anchovies.

Data on fishmeal production by port indicate that Chimbote has the highest outturn per ton of fish. The newest, most efficient processing plants—with evaporator equipment that reportedly increases fishmeal outturn by about 10 percent—are located at this port.

By 1970 Peruvian fishmeal production should be influenced to some extent by increased outturn resulting from greater use of evaporator equipment. Production is expected to be about 2 million tons by 1970 and remain at that level through 1975.

Distribution

Utilization

Peru's domestic consumption of fishmeal appears to have leveled off at about 30,000 tons and is not an important factor in the country's export availability. In the longer run, consumption should show some growth as population increases and production of livestock, particularly poultry, expands.

Generally, the limiting factor in the utilization of fishmeal is not the amount that can be used as a feed ingredient at a given price, but rather the availability of raw material. Fishmeal is used extensively in poultry rations, especially in the United States and other developed countries. These rations account for an estimated 90 percent of all the fishmeal consumed. As much as 10 percent of poultry feed can be fishmeal; the remainder includes grains and other meals. This percentage could go even higher if the fat content of the fishmeal were reduced. However, at the present price relationship between fish oil and meal—meal being higher priced—there is little incentive in producing countries to reduce the fat content.

Hog rations account for the remaining 10 percent of fishmeal consumption. Fishmeal is not normally used in cattle feed, as cattle reject it because of its odor.

Exports

Virtually all of Peru's expanding fishmeal production has moved into export markets. During the period 1957-59, Peru had only three sizable export markets: the United States, West Germany, and the Netherlands. Although these countries continued as Peru's top three markets after 1959, new markets were found in Spain, Italy, Japan, Yugoslavia, East Germany, and many other countries as production increased (table 8). Peru is currently seeking a market for fishmeal in the Soviet Union.

Fishmeal exports on a monthly basis were well maintained in 1967, when for the entire year they reached 1,560,000 tons (table 9). Exports in 1968, assisted to a large extent by the record stocks carried over from 1967, reached a new peak, exceeding those of 1967 by more than 30 percent. In 1969 Peru will have a difficult time maintaining these export levels in view of (1) the decline in stock levels, (2) a possible decline in fish catch, (3) increased competition from other fishmeal exporters, and (4) increased competition from other protein sources like oilseed meals and synthetics. It appears as though Peru has seen its greatest expansion in production and exports of fishmeal. However, this country is expected to remain important in world trade in high-protein meals.

Marketing

Neither the Peruvian Government nor the fishmeal industry carries on any market development activities for this commodity. Some in the industry feel that the fishmeal selling price is all that is needed to find new markets. A review of Peru's exports seems to support this conclusion.

Fishmeal sales are handled primarily by exporter groups in Peru. There are four associations that handle an estimated 90 percent of the fishmeal exports. These groups, with their estimated percentages of exports, are:

Association	Estimated percentage of exports
Consorcis Pesquers del Peru, S.A. A. M. Quesada 260 - Piso 3 Lima, Peru	50
Pesqueros Asociados del Peru Edif. El Pocifico - Piso 10 Plaza Washington Cuadra 6, Ar. Arequipa Lima, Peru	20
Sindicato Nacional de Productores de Harina de Pescado S.A. Rufino Torrico 889 - of. 101 Lima, Peru	10
Asociacion de Productores de Harina de Pescado S.A. Jr. Azangaro 235 - Piso 2 Lima, Peru	10

Bulk vs. bag shipment

A relatively new development is taking place in the shipment of Peruvian fishmeal. Except for a short period in 1963, all fishmeal exports were made in bags. Now, one exporter group—Consorcis Pesquers del Peru—is reportedly pelletizing some of its fishmeal and shipping it bulk; plans called for 120,000 tons to have been shipped this way in 1968. Other exporter groups are also bulk shipping fishmeal.

In the past, one of the biggest problems that inhibited bulk fishmeal exports was the chance that the meal would overheat and cause a fire. The heat was caused by oxidization of the fat in the fishmeal. A new development in the industry is the use of an antioxidant that is reported to slow down the oxidation process, thus reducing the likelihood of fires.

A number of savings are made possible by converting from bag to bulk shipment. One of these is the cost of bagging, estimated at about $7 per ton. Although loading and discharging would be easier for bulk shipments, it is unlikely that any savings could be effected in this area since labor unions would vigorously resist any labor or wage reductions. Space requirements on tramp vessels, and therefore freight costs—would definitely be reduced. For example, a tramp vessel of 10,000 tons dead weight could carry a cargo of approximately 8,500 tons in terms of weight or 500,000 cubic feet in terms of volume. Bagged fishmeal occupies about 80 to 84 cubic feet per ton. Therefore, a maximum of only about 6,000 tons could be loaded in this vessel. Bulk shipments, which do not require ventilation, occupy about 60 cubic feet per ton, allowing a load of over 8,000 tons in the same vessel. This represents a freight saving of about 25 percent.

Because of the substantial savings possible, exporters will probably tend to favor bulk over bag shipments in the future. One drawback to this type of shipment, however, is that importing countries would have to install decontaminating units (to kill bacteria like salmonella) at their principal ports of arrival before any major switch from bag to bulk could take place. A U.S. importer is reportedly installing such a unit. West Germany recently prohibited bulk imports of fishmeal because of the salmonella level. Bulk meal will have to be pelletized before the West Germans will allow it to be imported.

Bulking fee

The U.S. importer pays the Peruvian exporter a bulking fee—equal to 2 percent of the contract price—to compensate him for the difference between the gross and net weight of the fishmeal. This fee is expected to cover losses from evaporation, oxidation, pilferage, handling, and other causes. It was initiated because U.S. customers prefer to purchase fishmeal on a bulk basis, while Peruvian exporters ship it to the United States primarily in bags. Since most Peruvian ports do not have weighing facilities, the number of bags shipped is estimated at the quantity needed to fill the bulk order, and a letter of credit is issued on the shipper's value of the meal.

Once the meal arrives in the United States, it is stored bagged, sometimes for as long as 6 months. It is not weighed by the U.S. importer until it is dumped from the bags into a car or truck for bulk shipment to a customer. Final payment to the Peruvian seller is made on the basis of the net weight of the meal.

Foreign exchange earnings

The importance to Peru of the fishmeal industry can be measured by the contribution of the industry to the country's foreign exchange earnings, in addition to the social benefits provided in the way of jobs and auxiliary industries, like shipbuilding, transportation, spare parts, etc.

In 1958, when the fishmeal industry was in early stages of development, fish product exports contributed about 7 percent to Peru's foreign exchange earnings. By 1961 this percentage had increased to 14, and in 1967 it was 27 percent, or $204 million out of a total of $757 million. Fish products have replaced copper as Peru's number-one dollar earner (table 10).

Fishmeal has become such an important industry to Peru that the government has taken several steps during the last few years to assist the industry. In the latter part of 1967 the government decreed that no duties would be required to be paid on exports until April 1968. The government subsequently canceled this debt for the industry. Export taxes have been reduced, and in June 1968 import duties on evaporator equipment for processing plants were removed.

Table 1.–PERU: Percentage Distribution of Fish Catch and Meal Production

	1962		1963		1964		1965		1966		1967	
Port	Anchovy catch	Fishmeal production	Anchovy catch	Fishmeal production	Anchovy catch	Fishmeal production	Anchovy catch	Fishmeal production	Anchovy catch	Fishmeal production	Anchovy 'catch	Fishmeal production
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Chimbote . . .	31.9	34.4	27.5	29.2	34.5	36.2	27.9	29.7	28.7	30.3	33.1	35.3
Callao	31.3	30.5	27.6	27.1	19.3	18.9	18.7	18.3	13.5	13.2	12.2	12.0
Tambo de Mora	–	–	2.2	2.2	5.6	5.9	10.8	10.5	10.4	10.2	11.0	10.9
Supe	10.4	10.3	11.7	11.5	10.0	9.7	10.0	10.1	11.4	10.8	9.8	9.4
Pisco	.4	.4	.9	.9	1.3	1.3	2.8	2.6	3.6	3.8	8.4	8.3
Chancay	5.9	6.0	8.5	9.0	6.1	6.1	7.3	7.3	6.0	6.2	4.8	4.9
Huarmey . . .	4.9	4.7	3.9	3.8	3.7	3.7	3.5	3.5	4.1	3.9	3.6	3.4
Huacho	6.7	6.6	8.1	7.1	4.6	4.4	4.1	4.3	3.6	3.9	3.6	3.3
Ilo	2.4	2.9	4.1	4.2	6.3	6.7	4.5	4.6	6.8	7.3	3.1	3.2
Casma	1.0	1.0	.7	.7	2.5	2.5	2.2	2.3	2.8	2.4	2.7	2.7
Vequeta	–	–	–	.9	.9	.9	1.4	1.4	1.8	1.9	1.9	2.0
Chicama	–	–	–	–	–	–	.2	.2	1.2	1.1	1.7	1.7
Atico	2.1	.1	1.5	.5	1.7	1.2	1.4	1.9	1.4	1.6	1.3	1.0
Pucusana . . .	.1	.8	.5	.8	1.2	.6	2.0	.8	1.5	.8	1.1	.7
Mollendo . . .	.9	2.2	.9	2.2	.7	1.4	.9	1.3	.8	1.4	.7	.7
La Planchada .	2.0	–	1.9	–	1.4	–	1.2	.4	1.4	.9	.7	.3
Paita	–	.1	–	.1	–	.3	.6	.2	.9	.2	.3	.2
Cerro Azul . . .	–	–	–	(1)	.2	.2	.5	.6	.1	.1	(1)	(1)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Less than 0.05 percent.

Source: Instituto del Mar del Peru and Sociedad Nacional de Pesqueria.

Table 2.–PERU: Monthly Unloading of Anchovies by Major Ports, 1967

Port	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Metric tons	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*
Chimbote . . .	614,827	155,872	343,480	368,237	323,165	39,397	–	–	65,464	290,381	465,016	595,027	3,260,866
Callao	173,001	116,147	112,336	176,019	178,502	40,714	–	–	42,221	206,659	98,981	46,644	1,191,224
Tambo de Mora	203,752	97,783	67,934	157,371	92,356	17,924	–	–	29,403	107,415	165,174	135,656	1,074,768
Supe	127,548	24,333	110,083	114,987	133,619	621	–	–	28,365	174,079	126,391	123,477	963,503
Pisco	116,088	76,652	49,125	114,172	73,104	9,706	–	–	15,810	45,789	137,125	180,370	817,941
Chancay	58,824	28,324	41,423	97,520	96,822	2,009	–	–	20,908	76,082	30,322	18,186	470,420
Others	303,993	103,161	205,262	234,351	210,140	34,661	–	–	59,573	344,806	243,409	306,546	2,045,902
Total	1,598,033	602,272	929,643	1,262,657	1,107,708	145,032	–	–	261,744	1,245,211	1,266,418	1,405,906	9,824,624
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Chimbote . . .	38.5	25.9	36.9	29.2	29.2	27.2	–	–	25.0	23.3	36.7	42.3	33.2
Callao	10.8	19.3	12.1	13.9	16.1	28.1	–	–	16.1	16.6	7.8	3.3	12.1
Tambo de Mora	12.8	16.2	7.3	12.5	8.3	12.4	–	–	11.2	8.6	13.0	9.6	10.9
Supe	8.0	4.0	11.8	9.1	12.1	.4	–	–	10.8	14.0	10.0	8.8	9.8
Pisco	7.3	12.7	5.3	9.0	6.6	6.7	–	–	6.0	3.7	10.8	12.8	8.3
Chancay	3.4	4.7	4.5	7.7	8.7	1.4	–	–	8.0	6.1	2.4	1.3	4.8
Others	19.2	17.2	22.1	18.6	19.0	23.8	–	–	22.9	27.7	19.3	21.9	20.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	–	–	100.0	100.0	100.0	100.0	100.0

Note: Veda (closed season): Feb. 15 - March 14, June 15 - August 31; lockout: Sept. 1-24.

Source: Instituto del Mar del Peru

Table 3.—PERU: Development of the Industrial Fishing Fleet

Length in feet	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
35-39	29	85	97	93	96	79	93	106	107	105	106
40-44	8	15	34	53	58	62	64	72	74	76	75
45-49	12	25	37	56	62	76	77	79	76	72	70
50-54	–	2	8	12	31	50	83	114	120	124	126
55-59	–	1	1	8	28	49	64	114	129	136	144
60-64	–	1	1	1	1	13	50	222	283	309	379
65-69	–	2	2	2	2	2	1	18	44	203	521
70-74	–	–	–	–	–	–	–	–	3	24	53
75-79	–	1	2	2	2	2	3	13	19	28	49
80-84	–	–	1	1	1	2	5	8	7	12	12
85-89	–	–	–	–	–	–	–	–	–	–	–
90-94	–	–	1	2	2	2	2	2	2	3	9
95-99	1	1	2	2	2	2	3	3	3	3	2
100-109	–	–	1	–	2	2	3	3	3	3	2
110-119	–	1	1	2	2	5	5	6	9	9	9
120-129	2	2	2	2	2	2	3	3	3	3	4
130-139	–	1	2	2	5	6	6	6	8	9	10
Total	52	137	192	238	296	354	462	769	890	1,119	1,571

Source: *La Industria Pesqueria*

Table 4.—PERU: Monthly Anchovy Catch, Number of Fishing Days, and Average Daily Catch, 1967

Month	Fish catch	Fishing days	Average daily catch
	Metric tons	*Number*	*Metric tons*
January.	1,598,033	26	61,463
Feburuary	602,272	12	50,189
March.	929,643	12	77,470
April	1,262,657	20	63,133
May.	1,107,708	20	55,385
June.	145,032	10	14,503
July.	–	–	–
August	–	–	–
September	261,744	5	52,349
October	1,245,211	22	56,600
November	1,266,418	23	55,062
December	1,405,905	20	70,295
Total or average . . .	9,824,624	170	57,792

Source: Instituto del Mar del Peru.

Table 5.–PERU: Monthly Anchovy Catch, Number of Boats, Number of Trips, Average Catch by Boat and by Trip

Month	Anchovy catch	Boats fishing	Trips	Average catch	
				Per boat	Per trip
	Metric tons	*Number*	*Number*	*Metric tons*	*Metric tons*
1967:					
January	1,598,033	1,356	21,964	1,178	72.7
February[1]	602,272	1,294	8,919	465	67.5
March[1]	929,643	1,328	10,915	700	85.2
April	1,262,657	1,367	17,574	924	71.8
May	1,107,708	1,360	18,099	814	61.2
June[1]	145,032	951	2,955	152	49.1
July	–	–	–	–	–
August	–	–	–	–	–
September[2]	261,744	989	3,533	265	74.1
October	1,245,211	1,239	17,818	1,005	69.9
November	1,266,418	1,263	16,585	1,003	76.3
December	1,405,906	1,257	14,263	1,118	98.6
Total or average	9,824,624	–	132,625	–	74.1
1968:					
January	1,551,445	1,277	17,151	1,215	90.5
February[3]	1,026,029	1,261	12,361	814	83.0
March[3]	846,516	1,258	9,744	673	86.8
April	1,192,380	1,271	14,933	938	79.8
May	1,022,120	1,275	12,600	796	80.5

[1] Veda: Feb. 15-Mar. 24; 15 days in June; and August. [2] Lockout, 25 days. [3] Veda de verano (summer prohibition), Feb. 17-Mar. 17.

Table 6.–PERU: Fishmeal Supply and Distribution

Year	Supply			Distribution		
	Beginning stocks	Production	Total supply	Exports	Apparent domestic consumption	Ending stocks
	1,000 metric tons	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*
1953	0.3	12.0	12.3	10.4	1.4	0.5
1954	.5	16.5	17.0	14.0	1.4	1.6
1955	1.6	20.0	21.6	18.7	2.2	0.7
1956	.7	31.0	31.7	27.8	1.7	2.2
1957	2.2	64.5	66.7	61.6	3.9	1.2
1958	1.2	127.0	128.2	105.8	10.8	11.6
1959	11.6	332.4	344.0	277.6	20.5	45.9
1960	45.9	558.3	604.2	507.0	20.2	77.0
1961	77.0	863.8	940.8	760.6	23.4	156.8
1962	156.8	1,120.8	1,277.6	1,066.0	18.7	192.9
1963	192.9	1,159.2	1,352.1	1,159.7	25.4	167.0
1964	167.0	1,552.2	1,719.2	1,416.5	42.2	260.5
1965	260.5	1,282.0	1,542.5	1,260.0	45.1	237.4
1966	237.4	1,470.5	1,707.9	1,304.5	28.2	375.2
1967	375.2	1,816.0	2,191.2	1,560.9	30.0	600.3
1968	600.3	1,921.9	2,522.2	2,083.2	47.3	391.7

Source: Sociedad Nacional de Pesqueria

Table 7.–PERU: Anchovy Catch, Fishmeal Production, and Outturn by Months

Month	1963			1964			1965		
	Anchovy catch	Fishmeal production	Outturn	Anchovy catch	Fishmeal production	Outturn	Anchovy catch	Fishmeal production	Outturn
	Metric tons	*Metric tons*	*Percent*	*Metric tons*	*Metric tons*	*Percent*	*Metric tons*	*Metric tons*	*Percent*
January.	882,025	145,659	17.7	1,130,191	195,551	17.3	1,129,736	194,104	17.2
February	[1] 254,710	45,848	18.0	781,838	125,216	16.0	[1] 744,566	122,285	16.4
March.	681,048	122,030	17.9	1,098,029	175,170	16.0	1,120,212	191,930	17.1
April	751,094	129,104	17.2	919,453	158,505	17.2	840,175	149,911	17.8
May.	894,374	160,209	17.9	715,328	123,336	17.2	715,611	127,885	17.9
June	505,170	98,657	19.5	494,898	91,904	18.6	496,869	94,104	18.9
July	208,088	39,240	18.9	456,633	83,798	18.4	32,442	12,434	38.3
August	198,327	38,098	19.2	301,064	56,112	18.6	([2])	369	–
September	258,915	47,828	18.5	257,151	49,478	19.2	80,840	17,068	21.1
October	427,983	76,764	17.9	700,864	130,492	18.6	222,798	41,463	18.6
November	630,079	116,167	18.4	997,499	181,673	18.2	659,504	116,716	17.7
December	791,411	139,629	17.6	1,010,419	180,979	17.9	1,199,641	213,742	17.8
Total	6,423,244	1,159,233	18.0	8,863,367	1,552,214	17.5	7,242,394	1,282,011	17.7

Month	1966			1967			1968		
	Anchovy catch	Fishmeal production	Outturn	Anchovy catch	Fishmeal production	Outturn	Anchovy catch	Fishmeal production	Outturn
	Metric tons	*Metric tons*	*Percent*	*Metric tons*	*Metric tons*	*Percent*	*Metric tons*	*Metric tons*	*Percent*
January.	1,495,273	242,380	16.2	1,598,033	287,466	18.0	1,551,445	284,021	18.3
February	1,125,481	180,027	16.0	[2] 602,272	109,644	18.2	[2] 1,026,029	191,575	18.7
March.	1,236,491	197,076	15.9	[2] 929,643	163,512	17.6	[2] 846,516	155,233	18.3
April	1,071,376	174,134	16.3	1,262,657	226,047	17.9	1,192,380	212,054	17.8
May.	1,004,240	174,859	17.4	1,107,708	211,937	19.1	1,022,120	190,279	18.6
June	([2])	493	–	[3] 145,032	30,693	21.1	([2])	948	–
July.	([2])	428	–	([2])	467	–	([2])	14,763	–
August	([2])	246	–	([2])	699	–	([2])	17,683	–
September	690,082	135,468	19.6	[3] 261,744	51,673	19.7	([4])	257,439	–
October	918,072	175,711	19.1	1,245,211	232,831	18.7	([4])	247,678	–
November	[1] 6,864	2,337	34.0	1,266,418	241,017	19.0	([4])	183,927	–
December	[1] 981,942	187,319	19.1	1,405,906	259,997	18.5	([4])	166,300	–
Total	8,529,821	1,470,478	17.2	9,824,624	1,815,983	18.5	([4])	1,921,900	–

[1] Strikes: 1963, 22 days in Feb.; 1965, 14 days in Feb. in the northern zone; 1966, 29 days in Nov. and 15 days in Dec.
[2] Veda (closed season): 1965, Aug.; 1966, June 1-Aug. 31; 1967, Feb. 14-Mar. 14 and June 15-Aug. 31; 1968, Feb. 17-Mar. 17 and June 1-Aug. 31. [3] Lockout, Sept. 1-24. [4] Not available.

Source: Sociedad Nacional de Pesqueria.

Table 8.–PERU: Exports of Fishmeal for Feed by Country of Destination

Country of destination	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
	Metric tons	*Metric tons*	*Metric Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*
Germany, West . . .	11,475	26,651	73,244	107,286	150,492	251,819	182,108	256,443	315,544	255,390
United States	16,444	27,751	40,244	60,313	118,640	167,313	210,975	322,914	213,003	245,890
Netherlands.	27,126	32,926	100,400	159,958	204,019	281,007	190,711	234,913	213,552	175,898
Spain.	0	0	0	8,834	15,274	31,456	60,457	52,672	80,190	98,271
Italy.	0	0	100	8,760	15,115	41,872	51,441	76,135	75,274	81,877
Japan	0	0	0	17,016	22,745	30,073	61,712	92,833	56,409	65,339
Yugoslavia.	0	0	0	3,500	3,600	10,100	21,589	32,196	41,452	54,656
Germany, East . . .	0	0	0	0	0	0	34,001	34,460	78,302	77,694
Other.	6,600	18,449	63,712	141,375	178,481	242,243	225,276	323,553	339,280	246,999
Total.	61,645	105,777	277,600	507,042	708,366	1,055,883	1,038,270	1,426,119	1,413,006	1,302,014

Source: Official trade data.

Table 9.–PERU: Fishmeal Exports by Months

Months	1963	1964	1965	1966	1967	1968
	Metric tons	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*
January.	147,236	101,958	164,899	144,756	100,281	192,056
February.	104,102	100,676	130,184	118,211	115,673	188,222
March	103,912	186,053	169,744	137,648	117,282	170,107
April.	96,283	142,416	163,069	118,653	118,458	167,027
May	78,140	132,945	157,921	107,476	158,656	171,294
June	84,602	106,321	133,438	120,616	140,313	199,111
July.	110,365	141,642	110,255	110,955	132,735	167,373
August.	83,101	104,362	46,551	87,020	129,099	105,180
September	73,344	82,211	29,846	79,691	111,108	118,399
October	83,328	84,420	16,319	81,180	109,291	165,592
November	90,549	109,688	38,844	78,800	160,988	217,389
December	104,769	123,849	98,927	119,476	167,016	221,400
Total.	1,159,731	1,416,541	1,259,997	1,304,482	1,560,900	2,083,150

Source: Sociedad Nacional de Pesqueria.

Table 10.–Peru: Exports of Principal Products

Item	1961		1962		1963		1964		1965		1966		1967	
	Mil. dol.	*Percent*	*Mil. dol.*	*Percent*	*Mil. dol.*	*Percent*	*Mil. dol.*	*Percent*	*Mil. dol.*	*Pcrcent*	*Mil. dol.*	*Percent*	*Mil. dol.*	*Percent*
Fish products .	71.5	14.4	121.4	22.5	122.0	22.5	166.9	25.0	186.7	28.0	206.6	27.0	204.4	27.0
Cotton	80.0	16.1	97.1	18.0	91.4	16.9	91.3	13.7	87.4	13.1	85.0	11.1	54.8	7.2
Copper	105.1	21.2	92.3	17.1	87.3	16.1	103.0	15.4	121.2	18.2	186.2	24.4	198.3	26.1
Sugar.	64.2	12.9	54.4	10.1	64.9	12.0	64.0	9.6	36.9	5.5	47.1	6.2	53.2	7.0
Iron.	36.8	7.4	32.7	6.1	36.4	6.7	38.9	5.8	47.0	7.0	53.4	7.0	62.1	8.2
Silver.	27.6	5.6	32.8	6.1	35.8	6.6	45.2	6.8	39.1	5.9	41.4	5.4	42.3	5.6
Coffee.	22.8	4.6	24.2	4.5	25.6	4.7	37.0	5.5	29.0	4.3	28.5	3.7	29.1	3.8
Lead	22.3	4.5	16.4	3.1	16.4	3.0	33.0	4.9	37.9	5.7	34.6	4.5	30.2	4.0
Zinc.	19.1	3.8	15.9	2.9	15.8	2.9	39.1	5.9	35.8	5.4	34.0	4.4	35.7	4.7
Petroleum	14.5	2.9	13.2	2.4	9.8	1.8	9.6	1.4	9.3	1.4	7.4	1.0	8.5	1.1
Others.	32.5	6.6	39.5	7.2	35.8	6.8	39.0	6.0	37.0	5.5	40.2	5.3	38.4	5.3
Total.	496.4	100.0	539.9	100.0	541.2	100.0	667.0	100.0	667.3	100.0	764.4	100.0	757.0	100.0

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